Laser machine

Operation manual

User Manual

·please keep this file properly, not to supply again if lose

·we have the right to change without telling

Important suggestions

Honorific users:

Welcome to using our equipment.

After the equipment install well, users must operate and maintain it according to the item contained of "**Operation manual** ". Users who do not operate and maintain the equipment correctly will not continue to enjoy and be guaranteed again. It is an important link to maintain for using the equipment correctly and rationally. It would keep the equipment in good condition by in-depth maintenance, and lengthen the service life of the equipment.

Warning: **[1]. Please operate the equipment after reading "operation manual" carefully!**

[2]. Please check the laser tube when you receive the machine. Forbit to use the machine if you find the laser tube is broken. Please contact us.

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One、 Performance characteristic

The laser engraving machine gathering calculator, laser technique, automatic control and precision machine in the integral whole of high-tech product are manufactured by Jinan PHILICAM . Extensively applied to various professions, such as plate making, advertisement, electronics, handicraft product…etc., the following is the main characteristics:

1、The advanced laser are being substituted for the traditional mechanical burin. Compared with artificial or machinery carving machine, there are a lot of advantages changed into the laser carving machine, summarizing to mainly have:

(1) DO not need any jigs, and you can begin to work after the work pieces only need to be put on the workplace. It is convenient and efficient very much;

(2) Material of soft or hard have no special request, the application is more wide;

(3) Engraving quality is best, the three-dimensional effect of the pattern is strong

(4) Working efficiency improves doubly;

(5) the net point scans result is outstanding.

2、DSP control panel with more steady, more advanced performances

What the laser carving machine adopts is DSP control panel with more steady, more advanced performance using domestic and advanced professional numerical control technology to develop, it adopt high-power driver to control the stepping motor which run steady, and the precision is higher.

3、designed with friendly operation interfaces, and operating with proficiency.

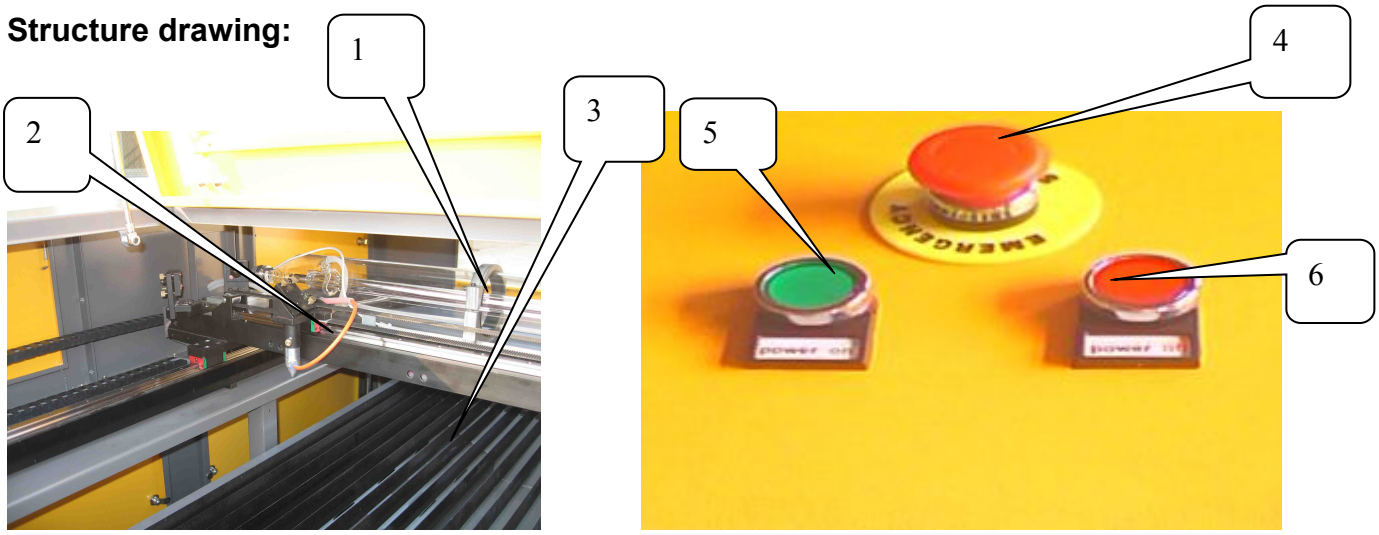
4、Model of the whole Lucite cover, make the machine elegant in appearance, and it is safe and comfortable while working.

Second、 Main technical parameter

Model	FLDJ4060	FLDJ6090	FLDJ1390	FLDJ1325

Max. working area (mm)	400*600	600*900	900*1300	1300*2500
Laser tube(reference)	working life:8000～10000 hours power: 80W, 100W, 150W, 180W			
Buffer memory	Decided by the computer			
Drive	DC stepping subdivision accurately (controlled by drivers)			
Enviroment temperature	5~35°C			
Cooling way	Water cooling type			
Power supply	AC220V/50Hz			
Processing range	nonmetal including Lucite, rubber and plastic, wood etc.			

Structure drawing:



1” laser tube
2” laser head
3” working table
4” Emergency stop
5” power on
6” power off

Operation panel instructions：

: In all interfaces, if the Reset button is pressed (or system is powered), the mainboard will be reset, machine will find origin and interface will show “in resetting”. After the machine successfully comes back to origin, the laser head will automatically move to positioning point set last time. If last work before reset is successfully finished, system will show main interface 1. If last work before reset is not finished (power off during processing), after restarting the machine, the interface will show “whether continue to engrave”. If you click “Enter”, the machine will find the cutting point during power off and continue to cut the unfinished graph. If you click “Esc”, return to main interface.

: Stop operation

: Start/pause processing.

: Confirm

: Exit the current interface

: Laser ON/OFF

: Enter auxiliary interface

: Travel along frame. The laser head will not emit laser, but rapidly travel along frame of processing graph. The function is mainly used for positioning.

: Processing file saved in control mainboard

: If you press the button, the mainboard will take X/Y axis position of current machine as relative origin of graph.

: Direction buttons: upper, lower, left and right

: Click the button and and to move Z axis. The function shall be supported by device hardware.

Third、 the safety guide

1. Ensure using the safe voltage, need conform to the earthed requirements ＜4Ω.
2. Please don't run the machine in humidity greater more than 60% environment.
3. The environment temperature should keep in 5 to 35 degrees Centigrade.
4. Before running equipment, to be sure the cooling system had already run well.
5. While working, please don't stretch hands into the workplace.
6. Forbid sundries to fall into the linear bearing.
7. Please don't regulate the electric current while working.
8. Forbid the attendant leaving the work place while working.
9. When the laser engraving machine works for three hours in succession, can not work again until after shutting down for half an hour.
10. Please not to use it when the thunder.
11. Forbid to pull out and insert the power cable and the communication cable under the electric state.
12. Such abnormal phenomena as cannot find any laser or the coordinate system collides

while operating, should cut off the power first, start the machine after fixing a breakdown.

13. Forbid dismantle the machine by yourself or maintain it by person who is not authorized by our company.
14. The linear bearing, the lens and the reflector should be cleared up regularly.
15. Please keep the machine clean and dry.

Must strictly observe the above safely guide! In the following chapters, will repeat the above safely guide according to the workflow, in order to strengthen your understanding and impression.

Please note, the producer does not bear responsibility for personal harm and property loss caused by the fact that users violate above-mentioned items.

Forth、 Installations

1、Adjust the ground feet of the engraving machine , keep the machine firm and no rock. Examine whether the laser tube has been broken, and whether each part is loose or not.

2、Install the exhaust fan system, connect the vent-pipe on the exhaust fan behind the machine, another end is installed outside, the max interval between the exhaust fan and place with a draught outside is 2 meter. Limited by local environment, should dispose the exhaust fan system in addition if extending the vent-pipe more.

3、put to earth firmly(there is the earthed position in the rear of the machine).

4、Check AC 220V supply line whether the voltage is normal. Must use special power supply line and the regulated power supply when it's necessary. (The power is 2KW)

5、The cooling system this machine adopts is to supply water circularly by the submersible pump outside the machine. The user need prepare the bucket with cover by oneself. The altitude difference between the machine and the submersible pump should not be more than 0.6 meter. The circulatory water for cooling has been clear and pure, and has no dust.

6、The temperature of the circulatory water for cooling should be lower than 35oC, otherwise influence the depth of engraving. Should guarantee that there is no frozen phenomenon of stopping up in the laser tube, especially for the extremely cold areas, otherwise the laser tube will explode to crack. Had better let off water from the circulating water road and the laser tube completely in order to prevent result in crack.

7、If discover the laser tube appears the phenomenon of water shortage, should shut down immediately and stop work, cut off the submersible pump power. And shut down more than half an hour at least, after waiting for the laser tube nature cooling, can supply water and begin to work, if supply water immediately, the laser tube will crack by explosion.

8、Connect the submersible pump, cooling water should circulate normally, the cooling water road should not be stopped up and dribble.

9、Install the control board and software into your computer according to 《software operating manual》, and link the communication cable well.

10、Connect air pump with intake, it is normal to let off air current under the laser head.

Fifth、Adjust the machine

1、Turn on the air pump, there is some air current letting off under the laser head.

2、Turn on the air pump, can not turn on the power until water flow out from water outlet . The laser head run to the right at first, run upwards after receive the signal of the X axle reset;

Simple method to earth

1) Two galvanized pipes which the length is 1.5 meters and the diameter is 25mm, and make one end into the inclined plane, another end would be welded with one single copper core cable which the diameter is more than 8mm^2
2) Knock two pipes into the ground vertically, and the interval between two pipes should be more than 2 meters. Meanwhile, leave 30-50mm on the ground.
3) Fetch salt 2kg, melt into the brine, and then water it all around two tubes.
4) Measure the earthed resistance, should be less than 4Ω(＜4Ω). Please water the brine again if the earthed resistance is more than 4Ω, until＜4Ω.
5) Connect the two pipes (8mm^2) to both the screw marking the earthed symbol on this machine's outer shell and the computer's outer shell separately.

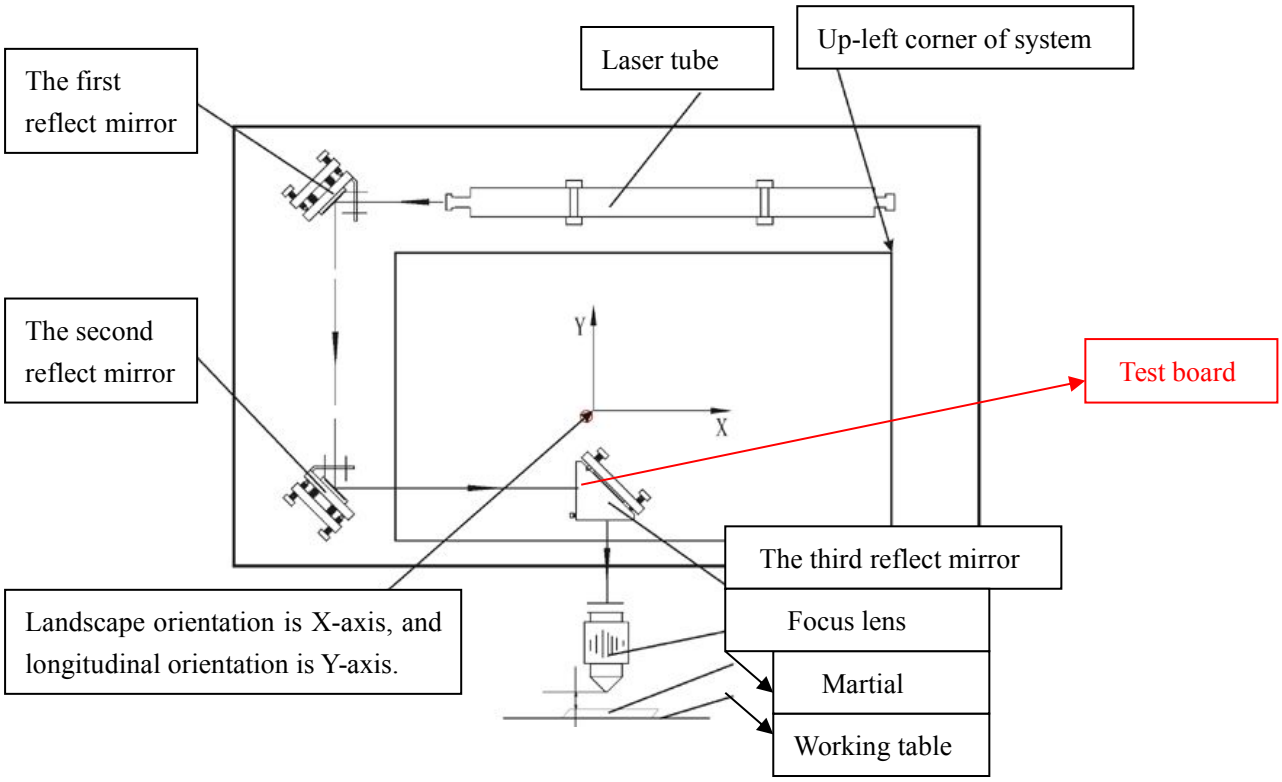
get back to the upper right corner finally after receive the signal of the Y axle reset, The

machine is in initial state at this moment.

3、Under the initial state, regulate the laser intensity smaller, then press "test" Key several times in succession, judge whether there is a phenomenon of high pressure to flash sparks in the machine. If have already flashed sparks, should shut down immediately. Can start the machine after looking out the breakdown position and fixing the breakdown.

4、Fix a test board(You had better use the transparent Lucite or the paper sticky tape) on the entry of laser of the laser head (see picture 2). Move the laser head to the four corners of the workplace separately, and make a facula on the test board. Observe whether the faculae coincide with each other. faculae should be in the centre of the round hole, otherwise carry on the adjustment of light road.

(See picture 2)



Picture 2

5、to use the operation panel, please see《software operation manual》or "**Operation panel instructions**" in part 2.

6、adjust the Focus of the laser head: measure the parameter of the laser head oneself first (eg:30mm), the focus of lens that this machine adopts is 50 mm(F=50mm), so the interval from the undersurface of the laser head to engraved surface is 20MM(50-30＝20MM), the rest may be deduced by analogy.

Please note:

(1)What this laser engraving machine uses is the infrared light that can't see, forbid put each part of person body into the light rode during testing, In case that cause burning to you.

(2)Forbid touch the position of high voltage laser power in the rear of the machine when the machine is working, in order to prevent take place danger.

(3)Must put on the protection glasses during adjusting the light road, eyes can not get into laser reflect light road.

(4)Choose the suitable laser intensity, avoid engraved material burning.

(5)The adjustment of light road is a more careful job, there is certain technological degree of difficulty, if users are not very familiar with the knowledge of optics, please don't touch it blindly.

Make sure to keep in mind in any case, the light road should be terminated in the machine, can't emit the light outside the machine.

(6)The machine should be covered well during engraving, otherwise influence exhausting result. Should also cover the machine when the machine is not used, in case the dust enter, and influence the working result and shorten the normal service life of machine.

Sixth、Process basically

A、 Start the machine

1、 Open the submersible pump and the blower. Filled the laser tube with water and circulate normally.

2、 Turn on the power

3、 Turn on the laser power, examine whether emitting laser by clicking “test” key.

4、 Open the controlling software, Measure whether the laser head move in all directions or not.

5、 Put work piece well, adjust the focus.

6、 Turn on the exhaust pump power.

7、 Operate the computer and transmit the file, begin to engrave or cut.

B、 close the machine

Close laser power, switch power, the exhaust pump, air pump and the submersible pump sequentially.

The usage of machine is the usage to the software. Detail please read 《software operating manual》.

Seventh、Daily maintenance

1、To clean the linear bearing before using the machine each time, and lubricate it , then lubricate again after using, it is suitable for the lubricating oil no dripping.(sewingmachine oil is better)

2、Each screw fastened on the linear bearing and the laser head should be examined once a month, fasten it with tool after finding loosening.

3、Keep the cooling water clear, the water temperature is less than 35℃ while working.

Clean the lens in the laser tube and the reflector each week, or clean them according to the polluted degree.

Use absorbent cotton and absolute alcohol to clean the lens

The lens belongs to the breakables, be careful extremely while cleaning and installing.

One surface of this kind of lens is plane, another surface is convex. The plane surface is up.

4、clean the vent-pipe and the exhaust fan according to the size of workload and the polluted degree.

That would influence the engraving quality if the result of exhausting is not very well, and also pollute the lens and the holophote, will decrease the service life.

5、The machine surface, the worktable surface, the surface of installing the linear bearing, the stepping motor and the belt should be kept clean. There cannot be water and greasy dirt, especially sundries. If water or oil is dripped to the surface carelessly and should be cleaned out at once after using.

6、Keep the worktable surface and the surface of the installing linear bearing clean. The damaged motor, main board, other parts etc. due to water or greasy dirt would not be maintained.

7、Keep the belt tightness well, please tight it if the belt loosen.

8、The equipment should not be left unused for a long time, should use once a week at least, work ten minutes at least.

9、Please cover the dustproof cloth after using each time.

10、Should check the earthed status once a month.

11、Must keep dry in the machine, especially for the frame of the holophote and the laser power. Please cut off the power supply if users find that there is some dew on them, and then dry them by a blow dryer.

12、Should adjust the light road as soon as possible if it became deflective during engraving.

13、Must cut off 220V power supply first during obviating the breakdown, strictly forbid pull out or insert each kind of cable and linking wire within the machine under electric state.

14、Before using, should check whether cooling water and various kind of outer lines are normal. Strictly forbid using the machine without cooling water circulation, in case the laser tube explodes to crack due to be overheated.

Eighth、find out and resolve problem

Trouble phenomenon	Possible problem	Find out and resolve problem
The engraving depth is shallow	1、add too much water while engraving	Reduce and add water evenly
	2、The lens or the reflector are polluted	Clean the lens and the reflector
	3、the lens position is not right	adjust the lens position, the method is in " operation manual"
	4、the raw material quality is not very well	change the raw material
	5、the laser wore out	Change the laser tube
the contour of engraved item is not clear-cut, the engraving depth is not well-proportioned	1、not add water on the seal surface	add water evenly
	2、the lens position is not right	to adjust the position of the lens, the method is in " operation manual"
	3、the raw material quality is not very well	Change the raw material
	4、the lens wore down	Change the lens
	5、the lens or the laser head became loose	fasten the lens or the laser head
	6、lack the lubricating oil on the linear bearing, or too many greasy dirt cause the linear bearing not to slip smoothly	Maintain the linear bearing
	7、the laser wore out	Change the laser tube
	8、the laser power conk out	Change the laser power
It is in disorder while engraving	1、lack the lubricating oil on the linear bearing, or too many greasy dirt cause the guide not to slip smoothly	Maintain the linear bearing
	2、the belt is too much loose or tight	To adjust the belt
	3、there is sundries in the machine	Clean up sundries

	4、the control main board damaged	Change it
	5、the motor wore out	Change the motor
	6、trouble of the software	Re-install the software
	7、trouble of the computer	Obviate the trouble or change the computer
	8、have some trouble when earth	examine and earth well
	9、limit switch conk out	Change the limit switch
has not reacted when began to work	1、there are some trouble with the power	check the power
	2、the fuse has blown.	Change the fuse（the same standard）
	3、the laser head has been locked by sundries	Clean up the sundries
	4、the switch power(5V/36V)has been damaged	Change
	5、the main board has been damaged	Change the main board
no emitting laser while the laser head is moving	1、there is some trouble with “the laser power”	Examine or change “the laser power”
	2、“the changeover switch” has been damaged	Change “the changeover switch”
	3、the laser power board has been damaged	Examine the board, and should change them if damaged
	4、the high voltage module has been damaged	Change the high voltage module
	5、 resistance has been damaged	Change the resistance
	6、The laser system discharges to the machine cover	make them insulated to exclude discharging phenomenon
	7、the laser head has been moved	Re-located the laser head

Ninth、Introduction to main wearing parts

1、laser tube

The laser tube that this machine adopts is a kind of CO_2 laser tube, and made in China which adopts the technical from Uk. The capacity of gas is certain; its service life is about 10000 hours. Its service life can be divided into four stages:

The first stage: Vigorous one, laser tube is being in optimum state at this moment; all respects are in the summit.

The second stage: Steady issue, laser tube is being stable state at this moment, laser intensity will weaken as compared with the first stage under the same electric current, but it is enough to carry on the normal work.

The third stage: decaying, after a very long time to use, each index of the laser tube begins to go down, laser intensity become weaker. Just now, you can still get the depth you

need through increasing the electric current and slowing down the speed.

The fourth stage: Exhausting one, laser tube is going to the end of its Service life.

So, we can found from above, the good or bad laser tube is basing on the length of steady issue, basing on our maintenance as well. The main point of maintenance is:

1) The running environment of the machine should be good, the power should be steady in voltage, if the voltage fluctuates is over, please disposes for AC regulated power supply. The putting of the machine should be steady, can't work under shaking greatly, moist environments.

2) The laser electric current can't be too high, must under 20mA, and regulate the laser intensity lower as much as possible on terms that meet the engraving depth and speed condition; 13-17mA is a comparatively appropriate electric current range.

3) Laser tube can generate heat, so we must guarantee the quality and quantity of the circulating water: Quality - -Guarantee it is clean and no sundries. Should change the circulating water regularly (2 days). When you change water, must keep the machine without working; Quantity - -Guarantee enough circulating water (About 20 kilograms), Guarantee the temperature of the circulating water is under 35 degrees Centigrade.

4) On terms that reach job requirements, to lengthen the service life of the laser tube as long as possible by the optimization working way. For example, you had better cut the work piece as much as possible.

2. The reflector and the lens

The surface of reflector and the lens got accurate polishing treatment, and plated a fine layer of membrane. Whether their surface is clean or not to affect the reflection rate and focus result of laser directly, need maintain and clean them regularly. Must strictly follow the step of maintenance to clean them. In this way, can lengthen its service life.

3. The submersible pump and the blowers

They are easy to maintain, should close them in time while the machine no working. And should dust and clean them regularly, so as not to influence its working result and life-span. The blower should have a certain protection measure. Can’t work under the environments of exposure to the rain or the sun.

Customer first ,Service Fist ,Quality First !